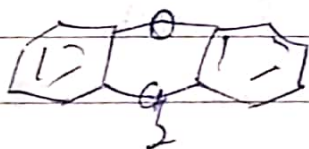


(colorless) (c)

#### 4) Xanthene dyes :

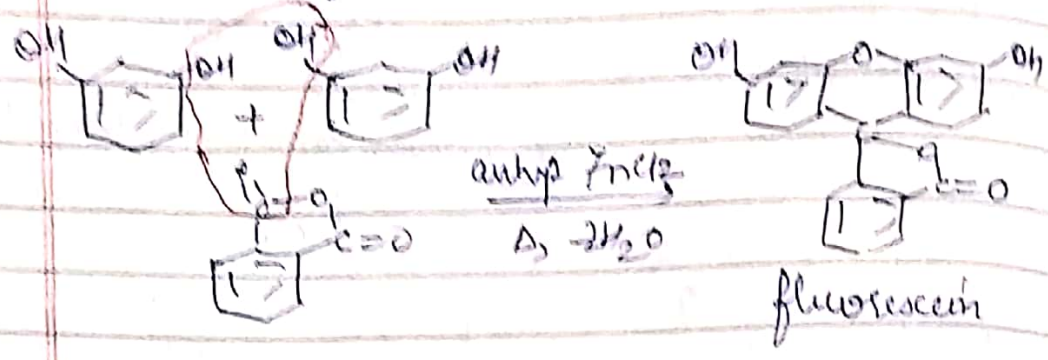
these are based on struct of xanthene (dibenzopyran)



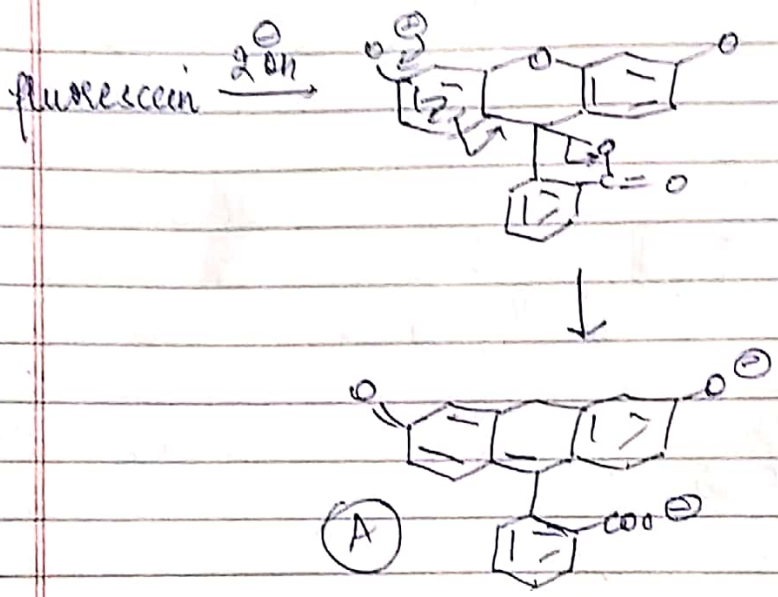
xanthene

a) fluorescein

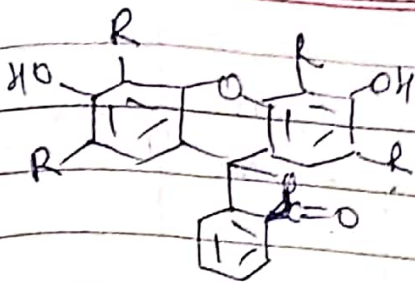
=> Prepared by 2 mol of resorcinol with phthalic anhydride in presence of conc.  $H_2SO_4$  or anhyd  $ZnCl_2$



=> Soluble in dil. alkali to give yellow green fluorescence (due to formation of its sodium salt which is quinoid form (A))



- => Used as a dye for wool and silk.
- => It is an intermediate for synthesis of tetrabromo derivative known as Eosine.
- => Eosine used for colouring leather, paper, ink & in dyes & cosmetics.
- => Red ink is the sodium salt of Eosine.



if R = Br ⇒ Eosine

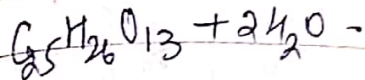
R = I ⇒ Acid Red 51

1) tetraiodo derivative of fluorescein, used to food coloring & photographic sensitizers. Known as Acid Red 51 gave blue shades.

5) Anthraquinone Dye  
derivative of Anthraquinone

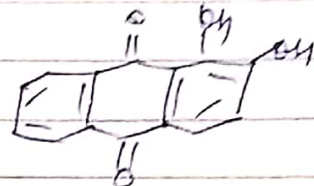
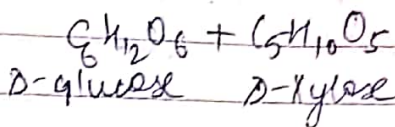
a) Alizarin

ancient, natural dye obt from madder root in form of glucoside called rubethyric acid (isolate from hydrolysis) which it was isolated by hydrolysis.

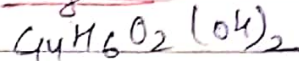


Rubethyric acid

with enzyme



Alizarin

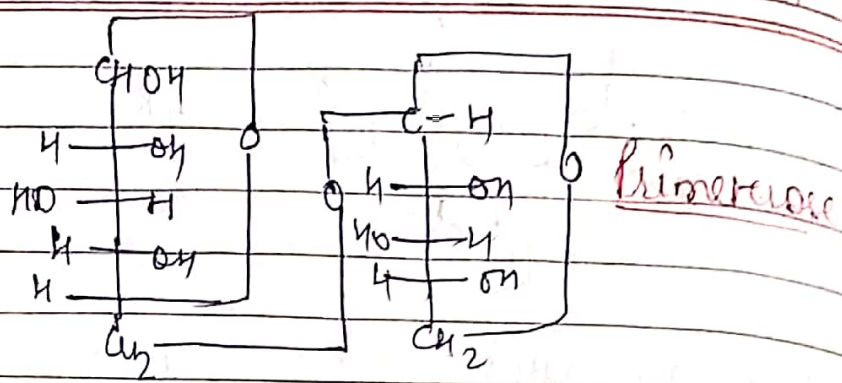


⇒ Earlier it was assumed Rubethyric acid on hydrolysis gives 1 mol of alizarin & 2 mol of D-glucose.

→ later it is shown that 2 mol of glucose were not present.

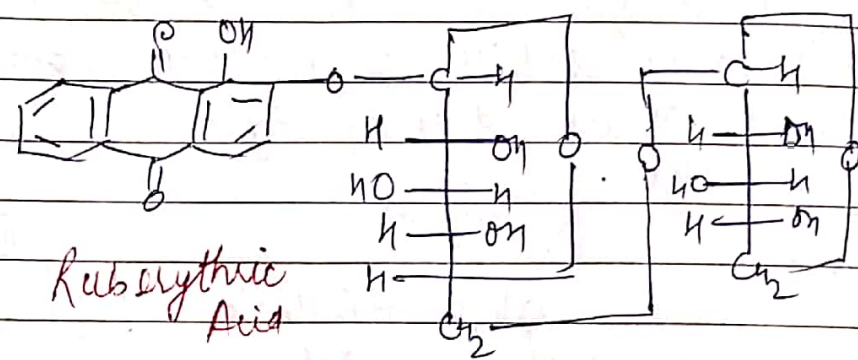
(by John & Robertson, 1933) later it is mixt of 2 sugars (D-glucose & D-xylose)

⇒ These 2 sugars present in the form of disaccharide Phloroglucoside.



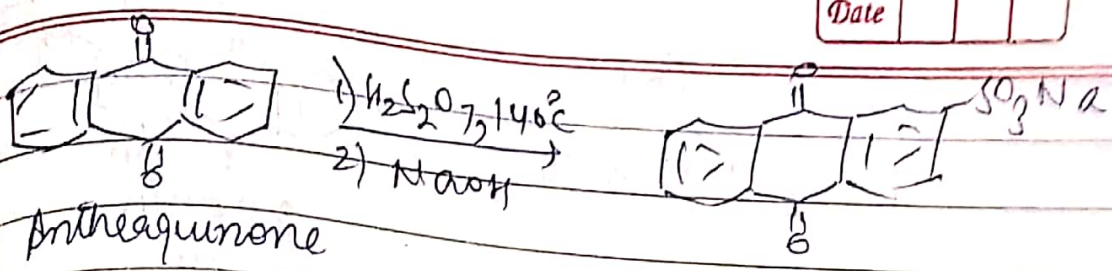
$\beta$ -D-xylopyranosyl-D-glucopyranose.

- ⇒ therefore, it follows that alizarin is linked to the glucose half of primrose mol.
- ⇒ the glycoside link is  $\beta$ , & that it is the 2-OH grp of alizarin that is involved.

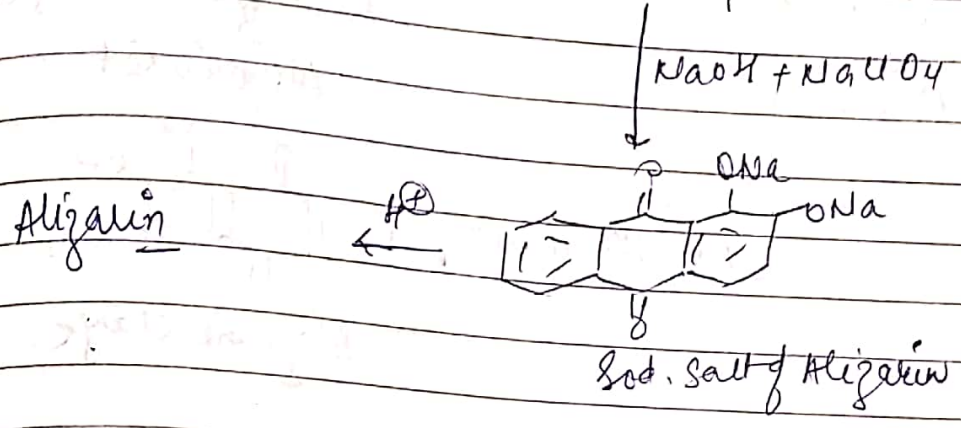


⇒ Alizarin is 1,2-dihydroxy anthraquinone.

⇒ Alizarin is manufactured from anthraquinone, which on sulfonation with oleum in absence of any catalyst, followed by fusion of resulting anthraquinone  $\beta$  sulfonic acid with NaOH containing calculated amt of Sod. chlorate or pot. chlorate at 200°C under pressure gave Sod. salt of alizarin. Lastly Acidification is done.



Sod salt of anthraquinone -  $\beta$ -sulfonic acid.



- $\Rightarrow$  It is Mordant dye, resulting color depend on metal used for mordanting.
  - with Al  $\rightarrow$  red color (Turkey red)
  - with  $\text{Fe}^{3+}$   $\rightarrow$  violet-black
  - with Cr  $\rightarrow$  brown-violet color.

$\Rightarrow$  Alizarin also used in medicine as a purgative.

$\Rightarrow$  3 derivative of it used for dyeing purpurin, alizarin orange & alizarin red (last 2 used for dyeing wool) given as below.

